

Precalc Warm Up #14-1

1. Graph $y = -2 \sec(2x - \pi)$ (2 periods)
2. Find $\csc(\arctan 5)$
3. Find $\arcsin(-\frac{1}{2})$
4. Find x , given $\sin(\frac{\pi}{2} - x) = -\frac{3}{5}$

Solving Exponential & Logarithmic Equations

If possible, make the base match and set exponents equal.

$$\begin{aligned}
 2^x &= 8 \\
 2^x &= 2^3 \\
 x &= 3
 \end{aligned}$$

$$\begin{aligned}
 3^{2x+4} &= \left(\frac{1}{27}\right)^{-2} \\
 3^{2x+4} &= (3^{-3})^{-2} \\
 2x+4 &= 6 \\
 x &= 1
 \end{aligned}$$

If you can't make the base match, take the log of both sides.

$$\begin{aligned}
 2^x &= 5 \\
 \ln 2^x &= \ln 5 \\
 x(\ln 2) &= \ln 5 \\
 x &= \frac{\ln 5}{\ln 2} \\
 x &\approx 2.32
 \end{aligned}$$

$$\begin{aligned}
 5(3^{4x+2}) &= 20 \\
 3^{4x+2} &= 4 \\
 \ln 3^{4x+2} &= \ln 4 \\
 (4x+2)(\ln 3) &= \ln 4 \\
 4x+2 &= \frac{\ln 4}{\ln 3} \\
 4x &= \frac{\ln 4}{\ln 3} - 2 \\
 x &= \frac{\ln 4}{4 \ln 3} - \frac{1}{2} \\
 x &\approx -0.119
 \end{aligned}$$

Use log properties to solve.

$$\log 2x + \log(x-1) = 1$$

$$\log(2x^2 - 2x) = 1$$

$$10^1 = 2x^2 - 2x$$

$$0 = 2x^2 - 2x - 10$$

$$0 = x^2 - x - 5$$

doesn't factor so
quadratic formula.

$$x \approx -1.79 \quad x \approx 2.79$$

← extraneous
can't take log of a negative

$$\log x - \log 2 = \log 9$$

$$\log \frac{x}{2} = \log 9$$

$$\frac{x}{2} = 9$$

$$x = 18$$

1. Evaluate $\log_a 40$ if $\log_a 2 = .3562$ and $\log_a 5 = .8271$

$$\log_a 40 = \log_a (2^3 \cdot 5)$$

$$= \log_a 2^3 + \log_a 5$$

$$= 3(\log_a 2) + (\log_a 5)$$

$$3(.3562) + .8271$$

2. Solve

a. $\log(3x-5) + \log(x+1) = 2$

$$\log(3x^2 - 2x - 5) = 2$$

$$10^2 = 3x^2 - 2x - 5$$

$$0 = 3x^2 - 2x - 105$$

$$\approx 6.26$$

$$\approx -5.59$$